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BRIEFER ARTICLES

THREE INTERESTING SPECIES OF CLAVICEPS

(WITH EIGHT FIGURES)

One of the fungi most commonly met in North Carolina occurs in sclerotial form upon *Paspalum laeve* and *P. dilatatum*.[1] Over large areas every plant may bear spikes showing one or more of these sclerotia. In summer they are covered with a yellowish coat of spores, and the fungus has heretofore been variously designated as *Sclerotium Paspali* Schw.,[2] *Sphacelia Paspali* Bornet, and *Spermoedia Paspali* Fr. The species was used extensively by the authors in a physiological investigation,[3] and is well represented in the accompanying photographs (figs. 1 and 2).

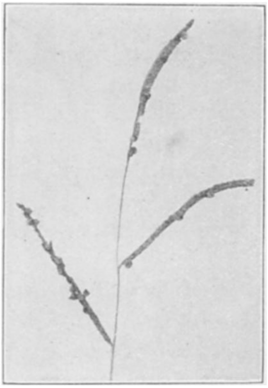

FIG. 1.—Sclerotia of *C. Paspali* as seen upon the host.

The abundance of the form and the fact that its perfect stage appeared to be unknown led us to attempt to grow from it an ascigerous stage. Numerous sclerotia which had wintered out of doors, naturally, were collected from the ground where they had fallen, and were planted on moist earth in glass capsules which were kept at room temperature. After about 20–25 days signs of germination appeared. Soon stalks 5–18 mm. long were developed, and on their ends round heads 1–2 mm. in diameter (fig. 3). By teasing or sectioning, perithecia and asci of the typical *Claviceps* form were found. But most remarkable, two clearly distinct types of perithecia, differing strikingly in size and shape, and bearing spores of decidedly different size, were found. The perithecia of the two forms are shown in figs. 4 and 5.

In the collection of the U.S. Department of Agriculture were found sclerotia from *Paspalum* bearing asci. These proved to be identical with the small-spored form of our own collection. Correspondence between

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[1] These species were kindly determined for us by A. S. HITCHCOCK.

[2] FARLOW, Host index, p. 153; also SACC. Syll. Fung. 14:1152.

[3] Variation of fungi due to environment. BOT. GAZETTE 48:1–30. 1909.

Professor ROLFS and the Department of Agriculture, which has kindly been placed at our service, shows that Professor ROLFS at Clemson in 1901 noted the ascigerous stage of *Sclerotium Paspali* Schw. on *P. dilatatum*, and further observed that the ascospores were disseminated largely by beetles, principally of the family Carabidae, which running over the ground came in contact with the spores, and later in seeking a high point from which to fly would run up the culms, over the pistils, and thus bring about infection of the ovaries.

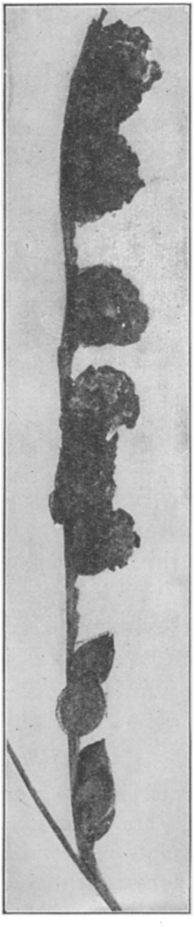

FIG. 2.—Sclerotia of *C. Paspali* upon the host, enlarged.

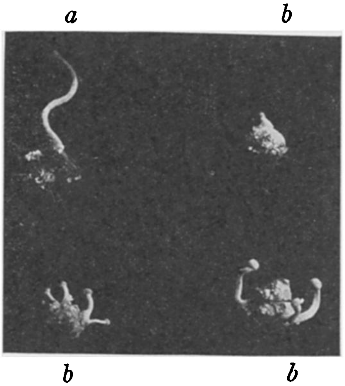

FIG. 3.—Sclerotia of *Claviceps* germinated: *a*, *C. Rolfsii;* *b*, *C. Paspali.*

Since the two species of *Claviceps* under discussion differ markedly from any heretofore described, and from the only *Claviceps* upon *Paspalum* (*C. lutea* A. Möll.), and from each other in many essential characters, prominently so in length of stipe and size of perithecia and spores, we herewith propose them as new species; the small-spored form as *C. Paspali;* the large-spored form as *C. Rolfsii.* The relation of these two species to *Sclerotium Paspali* Schw. is not definitely known. Both of them are associated with what has heretofore been known as *S. Paspali* Schw. It seems probable, therefore, that two sclerotial forms very closely resembling each other

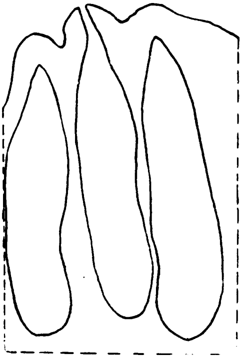

FIG. 4.—Perithecia of *C. Rolfsii;* magnification as in fig. 5.

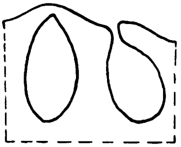

FIG. 5.—Perithecia of *C. Paspali;* magnification as in fig. 4.

have been included under the one name *Sclerotium Paspali;* but careful cultural studies and infection experiments alone can reveal the true relationship. That *Sclerotium Paspali* really belongs to the form-genus *Sphacelia*, where it was placed by BORNET, is also clear, possessing as it does small ovoid conidia borne upon simple slender stalks.

Claviceps Paspali, n. sp.—Sclerotia yellow to gray, globose roughened when mature, about 3 mm. in diameter; head dull yellow; stipe short to medium, usually not more than 1 cm. long, filiform; perithecia completely covering head, numerous, oval, 340×119 μ; asci cylindrical, 174 μ long; spores filiform, 101×0.5–1 μ.

Claviceps Rolfsii, n. sp.—Sclerotia yellow to gray, globose roughened when mature, about 3 mm. in diameter; head dull yellow; stipe filiform but thicker than in *C. Paspali*, 1–1.5 cm. long; perithecia few in head and mostly upon extreme distal portion, cylindrical ovate, 816×225 μ; asci cylindrical, 375×3 μ; spores filiform, 260–275×0.5–1 μ.

Upon gama grass (*Tripsacum dactyloides* L.) in late summer, and well into winter characteristic fungous growths are often seen protruding from the basal, ovulate portions of the spike, sometimes nearly every spikelet being affected (fig. 6). The structures are white, 12–20 mm. long and about 2–3 mm. thick. Toward their tips they may be browned and more shrunken than in regions near their bases.

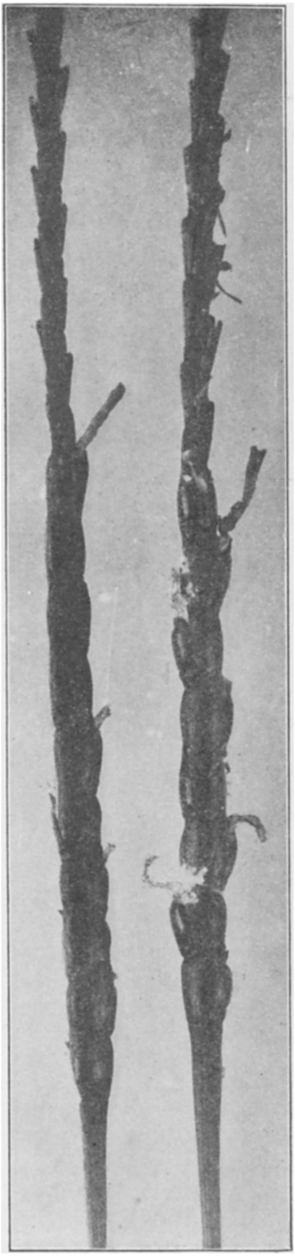

FIG. 6.—*C. Tripsaci* upon the host.

Examination of the affected spikelets shows the grain to be absent and its place to be occupied by a light-colored sclerotium approximately the shape of the grain of the host. In general the appearance is that of a *Claviceps* sclerotium, except that it is pale and soft, the protruding horn being the remnant of the summer stage. Throughout the early part of the season the protruding part bears myriads of straight to lunulate spores, showing strong resemblance to the ordinary lunulate *Fusarium* spore. The internal portion remains sterile throughout the winter. The appearance throughout was so *Claviceps*-like that sclerotia were collected in autumn and wintered in an open-air hibernating house, then planted for germination in the same manner employed with the *Paspalum* sclerotia. After some 20 days the emergence of ascophore stipes was noted, and 5 days later the heads were well developed (fig. 7). A particularly striking feature is the tendency of the stipes to fork and produce two or even four heads upon the same stalk. Teasing or sectioning showed typical *Claviceps* perithecia (fig. 8) and asci. The species seems to be new and we describe it as *Claviceps Tripsaci.*

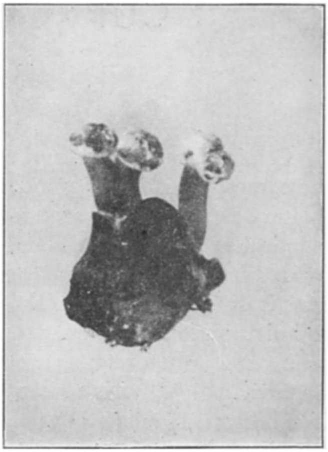

FIG. 7.—*C. Tripsaci:* sclerotium showing heads and stalks; ×2.5.

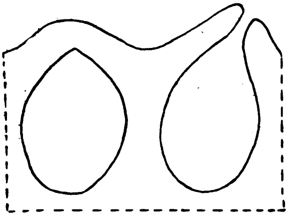

FIG. 8.—Perithecia of *C. Tripsaci;* magnification as in figs. 4 and 5.

Claviceps Tripsaci, n. sp.—Sclerotia smooth, white to dark brown or black, nearly conical, 4–5 mm. in diameter at base; heads gray to grayish white; stipe thick, white to purplish white, 1–1.5 cm. long; perithecia numerous, elliptical in longitudinal section, with a short beak toward the surface of the head, 390×153–187 μ; asci cylindrical, 145–175×2–3 μ; spores filiform, 130 μ long; conidia hyaline, continuous, fusoid to lunulate, 17.4–37.7×2.9–8.7 μ.—F. L. STEVENS and J. G. HALL, *N.C. Agricultural Experiment Station, West Raleigh, N.C.*